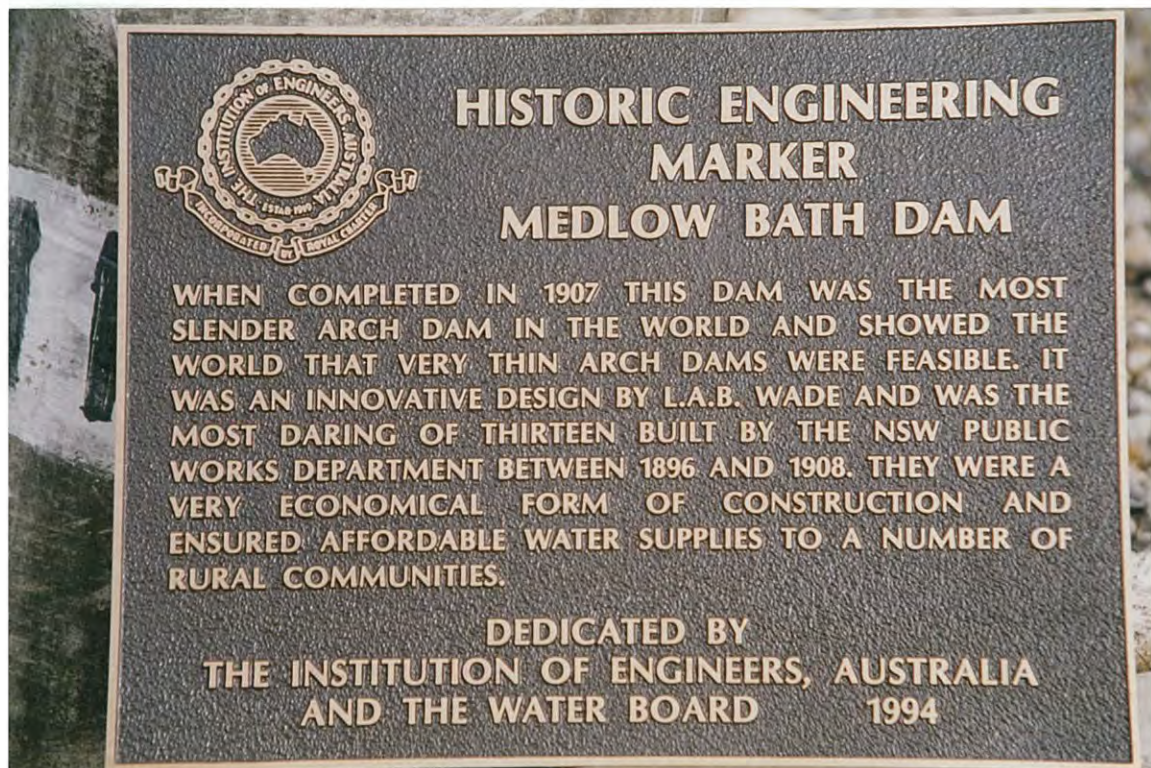


CEREMONY REPORT

FOR PLAQUING

MEDLOW BATH DAM

23rd July 1994





The dam wall, a modest structure but its proportions were of world wide significance at time of construction.



Delegates and families from the Country Engineers Convention
attending the plaquing ceremony.



David Robinson, representing the Water Board, and Doug Jones, Sydney Division President address the attendees.



The plaque unveiled.



Attendees inspect the Medlow Bath Dam.

INSTITUTION OF ENGINEERS, AUSTRALIA
ENGINEERING HERITAGE COMMITTEE
SYDNEY DIVISION

MEDLOW BATH DAM

THE THINNEST ARCH DAM IN
THE WORLD IN 1908

WILL BE DECLARED AN
**HISTORIC ENGINEERING
MARKER**

AT A PLAQUING CEREMONY ON
SATURDAY 23rd JULY, 1994
AT THE DAM SITE.

2 PM - MEET AT MEDLOW BATH BY CROSSING RAILWAY LINE
AT WESTERN END OF RAILWAY STATION, TURN RIGHT AND
WAIT FOR TOURIST COACHES OF I E AUST CONVENTION MEMBERS,
FOLLOW COACHES TO THE SITE.

Contact :- Dominic Cancian 899 3270 pm.

Program

Friday

5.00-6.30pm Registration of Delegates

6.30-7.30pm Pre Dinner Drinks

7.30pm Dinner

Saturday

7.00-8.30am Buffet Breakfast

8.30-9.00am Registration of Delegates

9.00-9.15am Welcome/Opening of Convention

9.15-12.30pm Organised Tour for partners & friends.

Topic: "Electricity Supply, the Community and the Environment of the Blue Mountains"

Victor Liondas - Prospect Electricity
John Van Pelt - EDAA (Aust) Pty Ltd
John Pascoe - BMCC Alderman

Topic: "Highway Development Strategy for the Blue Mountains" Peter Steele
- Roads & Traffic Authority

Topic: "Emergency Services Management in a Environmentally Sensitive Area." Bill Woodcock -
Blue Mountains City Council

Topic: "World Heritage Listing for the Blue Mountains" Keith Muir -
Total Environment Centre

12.30-2.00pm Lunch

2.00-5.30pm Depart for inspection of upper Blue Mountains to areas of Tourist Development, Environmental and Heritage significance including Echo Point. Delegates, Partners and children welcome. Plaque ceremony to place a Historic Marker on the 1908 Medlow Bath Concrete Arch Dam. This dam was the thinnest concrete arch dam in the world at the time. Delegates, Partners and Children are welcome.

*

5.30-6.30pm Country Group Chairman Meeting in Conference Room

6.30-7.30pm Pre Dinner Drinks

7.30pm Yulefest Dinner at Redleaf Lodge

Visit by Santa Claus

Carol Singing and Dancing

Sunday

7.00-8.30am Buffet Breakfast

9.30-12.30pm Depart for Steam Train Ride on Zig Zag Tourist Railway Park

12.30pm Lunch at Redleaf Lodge Resort

2.30pm Close Convention depart for Home or further Sight Seeing

Blue Mountains Country Convention

REGISTRATION FORM

Registration closes on Friday 15 July 1994. I wish to register for the 1994 Blue Mountains Country Convention and confirm registration by enclosing a cheque for \$..... payable to the Institution of Engineers, Australia, Sydney Division.

Name _____ Membership Grade _____
Address _____

Tel: (w) _____ (h) _____
Accompanying persons name(s) _____

Types of Registration

Type	Fee Cost
Type A	Member Registration including Welcoming Dinner, Saturday activities of technical sessions, tour, lunch, Yulefest Dinner, and Sunday Steam Train Trip and lunch Non member \$125 \$135
Type AA	Accompanying Persons including Welcoming Dinner, Saturday activities of tours, lunch, Yulefest Dinner and Sunday Steam Train Trip and lunch \$115
Type B	Member Registration for Saturday activities of technical sessions, tour, lunch, Yulefest Dinner and Sunday Steam Train Trip and lunch Non member \$95 \$105
Type BB	Accompanying Persons for Saturday activities of tours, lunch and Yulefest Dinner and Sunday Steam Train Trip and lunch \$85
Type C	Member Registration for Saturday activities of technical sessions, tour and lunch only \$40 Non member \$50
Type CC	Accompanying Persons for Saturday activities of tours and lunch only \$45
Children	Under 12 years, Saturday activities including tours, lunch and Yulefest Dinner and Sunday Steam Train Trip and lunch \$35 Total \$.....

Notes:

1. Registration does not include accommodation or breakfasts. Accommodations is to be booked direct.
2. All registrations are to be confirmed by mail and will include a Blue Mountains Information Package.
3. Completed forms with remittance and enquiries to:

The Secretariat
The Sydney Division's
Blue Mountains
Country Convention
Institution of Engineers, Australia
PO Box 138
MILSONS POINT NSW 2061
Att: Mrs Christine Mason
4. Enquiries to : Christine Mason
Phone: 02 929 8544
Fax: 02 956 7670
5. Refunds, because of catering arrangements will be required unless your cancellation advice is received by 24 June 1994.
6. Registration Charges in accordance with Type A, B, or C registration could be claimed as a deduction for income purposes under section 51 of the Act as Continuing Professional Education.

Organised by:

Jeff Roorda - Chairman, Sydney Western Group
and

Dominic Cancian - Secretary, Sydney Western Group

The Legend of Yulefest

A Blue Mountains Winter Festive Tradition.

Once upon a time, about 13 winters ago, a group of Irish visitors were staying at the Mountain Country House Retreat (formerly the California Mountain Lodge). The crisp climate reminded them of Christmas in Ireland. The idea was born that they have a traditional winter-style festive dinner and they asked the Lodge to give them a feast with all the trimmings. The group enjoyed themselves so much that they returned every winter. Other visitors noticed the decorations and festivities and began to book their own tables and join in the obvious delights of the winter festive celebrations.

The tradition has grown and it is not strange that it has. Winter festivities date back a long time and are a part of our folk memory. These celebrations have been known by many names: Mid-Winter Feasts, Winter Solstice, an today in the Blue Mountains, Yulefest.

The Blue Mountains is the authentic home of Yulefest. Our guest houses, resorts, hotels, motels and restaurants celebrate throughout June, July and August with turkey, ham, puddings, mulled wine, roaring log fires, decorations, carol singing and sometimes even a visit from Santa.

A Yulefest holiday can combine all the things for which the Blue Mountains are famous - warm hospitality, fine dining, cosy quest houses and antique shops full of charm and nostalgia, crisp mountain air, clear starry nights, stunning views and bushwalks, romantic atmosphere and maybe even some snow!

Sydney Divisions Blue Mountains Country Convention

*"Engineering Development
& Tourism in a
National Park"*

Date: 22nd - 24th July, 1994
Venue: Redleaf Lodge Motel
Blackheath
Blue Mountains

Major Sponsors

**PROSPECT
ELECTRICITY**



Minor Sponsors

Blue Mountains City Council
Roads and Traffic Authority
EDAW

*Celebrating the Institution's
75th Anniversary*

Memorandum



To: Ken McInnes, Victoria Division Representative, National Committee on Engineering Heritage

From: Robert Breen, Secretary, Commemorative Plaque Sub-Committee

Date: 19 October 1993

Subject: **1994 NATIONAL ENGINEERING CONFERENCE -
COMMEMORATIVE PLAQUE ASPECTS**

File No: 3/6/49

NATIONAL OFFICE

Ken,

As you are aware, the 1994 National Engineering Conference (NEC) will be held in Melbourne from 14 to 16 April.

It has been established practice to plan the unveiling of a commemorative plaque in association with the NEC. Should it be decided to continue this practice in Melbourne, it will be necessary to get the proposal to the Commemorative Plaque Sub-Committee in the near future to ensure the assessment, approval and supply process is completed in time for the conference.

Regards,

Rob

Robert Breen
Executive Officer

c.c. Geoff Sutherland, Director, Victoria Division
Tony Moulds, Chairman, National Committee on Engineering Heritage
✓ Dr Don Fraser, Convenor, Commemorative Plaque Sub-Committee

MEDLOW BATH DAM

SITE VISIT, Thurs 23 June 1994

Bob York — Water Board
Dominic Canian — IE Aust Country Convention
Don Fraser — IE Aust Heritage

Bob — will clear up site
— will give access on Sat 23 July

Dominic — will organise soft drinks & biscuits

Don — get IE Aust banner ✓
— speech notes for Doug Jones
— organise WB rep
check Bruce Rochaix — will ring me 11 July
— check Peter Allsopp for copy of report to Bruce

23 July — brief ceremony, inspection & photos
— discuss final plaque position.

13 July — David Robinson will represent
the Water Board at the ceremony.

14 July — Delivered copy of HEM submission
to his home.

To:- Dominic Cancian

From:- Don Fraser Tel/Fax 337 4867

Plaque for Medlow Bath Dam has been approved, now finalising wording.

Please contact Ian Langdon-Jones
of the Water Board ph ~~562 6380~~ ^{350 4578} FAX ~~562 6381~~ ^{350 4598}
and arrange access and the ceremony.

Should we visit the site, so let me know the result of your contact.

23/5/94 Ian Langdon-Jones

After site meeting

Don

16/5/94

Official letter to Ian
confirming date, place, time sent 1/7/94
hence access etc

Dominic — site meeting set for pm Thurs 23 June

David Robinson
12/7/94 sent fax of flyer
16/7/94 Delivered him a copy of HEM Submission

WB Ring
Fax 047 369115

Manager → Aaron Jega 047 825629
→ Bob York — Project Support Officer 047 823541

Bruce Rockaix — Asst Manager
047 369110

URGENT

14 Derby Street

Vaucluse 2030

Ph/Fax 02 337 4867

24 June 1994.



The
Institution
of Engineers,
Australia

SYDNEY DIVISION

George [redacted] Tsimias
~~Laurie Robson~~

Arrow Engraving & Foundry.

Dear Laurie,

BRONZE PLAQUE FOR MEDLOW BATH DAM

Rob Breen normally confirms orders for supply after clearing matters with me, the Convenor of the Plaquing Sub-Committee. On this occasion Rob is on leave and the ceremony for Medlow Bath Dam has been arranged for Saturday 23rd July, so I'm making direct contact with you in order to expedite delivery of the plaque.

Rob's last fax to you said "we are resolving some last minute queries regarding the wording". Here is the final version,

CREST

HISTORIC ENGINEERING
MARKER

MEDLOW BATH DAM

WHEN COMPLETED IN 1907 THIS DAM WAS THE MOST
SLENDER ARCH DAM IN THE WORLD AND SHOWED THE
WORLD THAT VERY THIN ARCH DAMS WERE ~~FEASIBLE~~
FEASIBLE. IT WAS AN INNOVATIVE DESIGN BY L. A. B. WADE
AND WAS THE MOST DARING OF THIRTEEN BUILT BY THE
NSW PUBLIC WORKS DEPARTMENT BETWEEN 1896 AND 1908.
THEY WERE A VERY ECONOMICAL FORM OF CONSTRUCTION
AND ENSURED AFFORDABLE WATER SUPPLIES TO A NUMBER
OF RURAL COMMUNITIES.

Note
deletion
of
1.30 pm
24/6/94

DEDICATED BY
THE INSTITUTION OF ENGINEERS, AUSTRALIA
AND THE WATER BOARD 1994

As a matter of urgency, could you prepare the bromide for my prompt approval and have the plaque delivered to my address during the week before the ceremony. Your cooperation in these accelerated will be greatly appreciated.

Thanks,

Don
D. J. Fraser.

28/6/94 10.30 am Rang Arrow,
spoke to Shirley, she
assured me that AOK.

Faxsimile:

Date: 24 June 1994

Total no. pages
(including this one)

2

To: Don Fraser
Convenor, Commemorative Plaque Sub-Committee

Fax number: (02) 337 4867

File: 3/6/90

From: Mena De Angeli, College Secretary

Subject: MEDLOW BATH DAM



The
Institution
of Engineers,
Australia

NATIONAL OFFICE

Reference our telephone conversation this morning.

After having looked at the file on Medlow Bath Dam I found the attached fax from D C Kemp. Rob's notation in the file is "DK fax - remove "perfectly". I cannot see any correspondence on file showing that he has been in touch with Arrow Engraving regarding this amendment. Please check this with Arrow Engraving when you contact them.

I mailed to you today the two IEAust banners for the Medlow Bath ceremony on Saturday, 23 July as requested.

Mena De Angeli

att

To:- George Tsimias — Arrow A&F
From:- Don Fraser ph/fax 02 337 4867

Thanks for the bromides re 3801. But the bromide I really want to see at this stage is for Medlow Bath Dam — final wording below. The ceremony is only 3 weeks away and I would like to receive the plaque on Monday 18 July by courier.

CREST

HISTORIC ENGINEERING
MARKER

MEDLOW BATH DAM

WHEN COMPLETED IN 1907 THIS DAM WAS THE MOST SLENDER ARCH DAM IN THE WORLD AND SHOWED THE WORLD THAT VERY THIN ARCH DAMS WERE FEASIBLE. IT WAS AN INNOVATIVE DESIGN BY L. A. B. WADE AND WAS THE MOST DARING OF THIRTEEN BUILT BY THE NSW PUBLIC WORKS DEPARTMENT BETWEEN 1896 AND 1908. THEY WERE A VERY ECONOMICAL FORM OF CONSTRUCTION AND ENSURED AFFORDABLE WATER SUPPLIES TO A NUMBER OF RURAL COMMUNITIES.

DEDICATED BY
THE INSTITUTION OF ENGINEERS, AUSTRALIA
AND THE WATER BOARD 1994

Thanks

Don

1/7/94

2.45 pm

FAX

To: IEAUST

Rob BREEN

06 273 1488

From: Dickson

08 3631000 DATE: 6.6.94

Re: MEDCON SATTA DAY

Rob,

Thanks for the copy of the advice
to Arrow Engineering of 27 May (received 3/6)

The phrase words are ~~ok~~
provided we remove the
word "perfectly".

I do not believe this word
fits into an engineering phrase

It is also ~~impaired~~ grammatically
incorrect ("perfectly" is an adv.)
to use it as proposed.

Dickson

Focsimile:

Date: 26 May 1994

Total no. pages
(including this one) 1

To: Arrow Engraving and Foundry Co (Attention Laurie Robson)

Fax number: (03) 553 2086

File: 3/6/90

From: Robert Breen, Executive Officer, Board of Engineering

Subject: DESIGN, MANUFACTURE AND SUPPLY OF BRONZE PLAQUE -
MEDLOW BATH DAM



The
Institution
of Engineers,
Australia

NATIONAL OFFICE

Laurie,

Further to my earlier fax on this matter - PLEASE HOLD THE DESIGN OF THE MEDLOW BATH DAM PLAQUE UNTIL FURTHER ADVISED.

We are resolving some last minute queries regarding the wording.

TONY MOULDS.

Your words can infer that Medlow set the pattern for the series of dams whereas it was the culmination of experience with the previous 11.

Robert Breen
Executive Officer

Regards Don

C.c. ~~Dr Don Fraser~~, Convenor, Commemorative Plaque Sub-Committee Fax: (02) 337 4867
Tony Moulds, Chairman, National Committee on Engineering Heritage

Rob Breen,

Left message at Tony's home at 10pm tonight and sent fax to his work suggesting the following amalgamation of his and my words for the Medlow Bath Dam plaque. I'm off to Toronto in the morning for two weeks so for you and Tony to finalise this one.

WHEN COMPLETED IN 1907 THIS DAM WAS THE MOST SLENDER ARCH DAM IN THE WORLD AND SHOWED THE WORLD THAT VERY THIN ARCH DAMS WERE PERFECTLY FEASIBLE. IT WAS AN INNOVATIVE DESIGN BY L. A.B. WADE AND WAS THE MOST DARING OF THIRTEEN BUILT BY THE NSW PUBLIC WORKS DEPARTMENT BETWEEN 1896 AND 1908. THEY WERE A VERY ECONOMICAL FORM OF CONSTRUCTION AND ENSURED AFFORDABLE WATER SUPPLIES TO A NUMBER OF RURAL COMMUNITIES.

Don 26/5/94

*requested by
Deane Kemp.
Tony Moulds
was also
unhappy with
this word.*

24/6/94

Faxsimile:

Date: 27 May 1994

Total no. pages
(including this one)

1

To:

Arrow Engraving and Foundry Co (Attention Laurie Robson)



**The
Institution
of Engineers,
Australia**

NATIONAL OFFICE

Fax number: (03) 553 2086

File: 3/6/90

From: Robert Breen, Executive Officer, Board of Engineering

Subject: **DESIGN, MANUFACTURE AND SUPPLY OF BRONZE PLAQUE -
MEDLOW BATH DAM**

Shirley / Laurie

Further to yesterday's faxes, the wording now required on the MEDLOW BATH DAM PLAQUE is as follows:

HISTORIC ENGINEERING
MARKER

MEDLOW BATH DAM

WHEN COMPLETED IN 1907 THIS WAS THE MOST SLENDER ARCH DAM IN THE WORLD. FROM A DARING AND INNOVATIVE DESIGN BY L A B WADE, IT WAS ONE OF A SERIES BUILT BY THE NSW PUBLIC WORKS DEPARTMENT BETWEEN 1896 AND 1908 WHICH SHOWED THE WORLD THAT VERY THIN CONCRETE ARCH DAMS WERE PERFECTLY FEASIBLE. THEY WERE A VERY ECONOMICAL FORM OF CONSTRUCTION AND ENSURED AFFORDABLE WATER SUPPLIES FOR A NUMBER OF RURAL COMMUNITIES.

DEDICATED BY
THE INSTITUTION OF ENGINEERS, AUSTRALIA, 1994

Please produce the design and forward a copy of the bromide to me before manufacture.

Robert Breen

Robert Breen
Executive Officer

c.c. Dr Don Fraser, Convenor, Commemorative Plaque Sub-Committee Fax: (02) 337 4867
Tony Moulds, Chairman, National Committee on Engineering Heritage
Members, Commemorative Plaque Sub-Committee(mail)
Ian Bowie, Chairman, Sydney Division Engineering Heritage Committee(mail)

Rob Breen,

Here's the final wording for Medlow Bath Dam plaque. There's a site visit Thurs 23rd June, any chance of plaque delivery to me Monday 20th? For final design check send fax to Ian Langdon-Jones on fax 562 6301.

Thanks
Don 24/5/94

HISTORIC ENGINEERING MARKER

MEDLOW BATH DAM

WHEN COMPLETED IN 1907 THIS DAM WAS THE MOST SLENDER ARCH DAM IN THE WORLD AND WAS ACKNOWLEDGED INTERNATIONALLY AS PIONEERING THIN CYLINDRICAL CONCRETE ARCH DAMS. IT WAS AN INNOVATIVE DESIGN BY L. A. B. WADE AND WAS THE MOST DARING OF THIRTEEN BUILT BY THE NSW PUBLIC WORKS DEPARTMENT BETWEEN 1896 AND 1908. ARCH DAMS WERE AN ECONOMICAL FORM OF CONSTRUCTION AND ENSURED AFFORDABLE WATER SUPPLIES FOR A NUMBER OF RURAL COMMUNITIES.

DEDICATED BY
THE INSTITUTION OF ENGINEERS, AUSTRALIA
AND THE WATER BOARD 1994

Copy:- Ian Langdon-Jones

Peter Allsopp ←

Arrangements now developing quickly. I'll be o/s from 27 May to 13 June.

Regards
Don

The Second Half of the Nineteenth Century

209

be found elsewhere. Brown, the Bear Valley dam's designer, was engaged in 1886 to plan an irrigation and water-supply dam on the Sweetwater river for the benefit of San Diego and National City. His design was nearly as bold as before, but this time the backers of the scheme lost their nerve, and the Sweetwater dam when finished in 1888 was a much more substantial structure than originally intended.²² It is an arch dam nonetheless: 98 feet high, 12 feet thick at the crest, 45 feet thick at the base and curved to a radius of 222 feet at the top.

The Sweetwater dam was most carefully constructed from locally quarried porphyry, a very heavy stone, and imported English and German cement. The quality of the dam's construction was severely tested in 1895, when heavy rainfall flooded the reservoir and for nearly two days the dam's crest was submerged to a depth of 22 inches (Pl. 56). The flood played havoc with the bed-rock below the dam—no less than 10,000 cubic yards of rock were washed away—and part of the outlet works was destroyed. But the dam experienced no damage, and its survival appears to have helped convince American engineers that a well-made arch dam was a perfectly sound proposition. It was also concluded, as it already had been in Europe, that even in a gravity dam curvature would increase a dam's stability and provide a degree of resistance against the formation of tension cracks caused by temperature variations. Thus the Hemet, La Grange and San Mateo dams, all built in California between 1887 and 1895, were arched dams, and more arched dams were built in other states.²³

In March 1909 L. A. B. Wade presented a paper to a meeting of the Institution of Civil Engineers in London entitled *Concrete and Masonry Dam Construction in New South Wales*.²⁴ Both the paper and the discussion which followed are of more than usual interest. It emerges that one of the earliest dams in Australia, the Parramatta dam, built to a height of 41 feet in 1852, was a masonry arch dam of 160-foot radius. In the 1890s nine more arch dams were built in New South Wales, followed by three others by 1906. All the dams were, for the time, extremely slender, and this fact caused something of a stir at the meeting of 1909, especially because for so many years gravity dams and their relatively heavy profiles had dominated the Institution's discussions of dam design.²⁵ For Sir Alexander Binnie, the collection of Australian dam profiles displayed produced a 'blood-curdling sensation', while C. E. Jones was extremely critical and warned that in his view Australian engineers had taken dam-building to a dangerous point. What exactly was it about the dams that caused these and other similar feelings of alarm and concern? We cannot look at all the dams in detail (a selection, however, is shown in Fig. 32), but leaving aside the much earlier Parramatta dam, it can be said that of the other dozen their height-to-mean-thickness ratios range from 2 up to 10.4,

Start
here

while for seven of them it is 5 or greater. The thinnest dam, Medlow (65 feet high), is 9 feet thick at the base, and the tallest one, Lithgow No. 2 (87 feet high), is 3 feet thick at the crest and 24 feet at the base.

Cost was the basic reason for the choice of thin arch dams, simply because so much less material was required for an arch dam than for the equivalent gravity dam. It was also on the grounds of expense that all the structures were made of Portland cement concrete for which a crushing strength of as high as 20 ton/ft² (310 lb/in.²) was allowed in six of the dams. In some cases, however, the compressive strength of the abutment rock determined the allowable stresses in the dams themselves.

The dams were all designed with nothing more than the cylinder formula $t = \frac{pR}{\sigma}$, and it was remarked at the time that this was a far from

adequate means of analysing or designing an arch dam. It was essentially the fact that high compressive stresses (compared with what was usual in Europe) had been used in conjunction with an over-simplified theory that caused people's fears to be aroused. Nevertheless these Australian arch dams had made their point. They had all been built and all performed satisfactorily and safely. True, some of them produced cracks due to temperature changes, but in such thin profiles even arch dams were prone to this weakness, especially if they were relatively long; it was only in those of high length/height ratio that cracking occurred.

Whatever the weaknesses of the cylinder theory and despite the apparently high stresses allowed, the thin arch dams of New South Wales were a success. They showed that arch dams of unprecedented slenderness were perfectly feasible. As a result it became the responsibility of theoreticians to confirm and explain on paper what had been forcibly demonstrated in practice.

The dozen arch dams of New South Wales and some others in Australia are a reminder of another development which was taking place at the end of the nineteenth century: the use of concrete as a material of construction. Its partial use for the cores of masonry dams and the core walls of earth dams goes back at least to the 1870s. Concrete formed the core of the Boyd's Corner dam built to supply water to New York in 1872, and a year earlier the Lynde Brook earth dam in Massachusetts was built with a concrete core wall. The San Mateo dam previously mentioned, built between 1887 and 1889 to supply water to San Francisco, was the first dam to be made entirely of concrete. It was used simply because suitable masonry was not available locally and would have proved expensive to bring in from elsewhere. It should also be remarked that this first all-concrete dam was a very large structure—170 feet high and 680 feet long. The task of building the San Mateo dam was itself an important piece of engineering because the techniques required to place a 'wet' material

rather than a 'dry' one on such a large scale posed new problems.²⁶ The work must have been well executed, however, because in 1906 the San Mateo dam successfully survived the San Francisco earthquake.

In 1899 the use of concrete in dam-building was taken a stage further in another Californian project. The Upper Otay dam, built between 1899 and 1900 to supply water to San Diego, is a thin arch dam 84 feet high, 4 feet thick at the top and 14 feet at the base. Its strength was increased by the lavish use of iron wires at the base, the first example, it would appear, of a concrete dam being reinforced.

In Great Britain concrete found its way only slowly into dam-building. Some early examples are the Blackbrook dam near Loughborough, built in 1906; the Blackwater dam, 86 feet high and over 3,000 feet long, built in 1909 for hydro-electric work in Scotland; and the Alwen dam of 1911-16 which supplies water to Birkenhead.

British engineers had, however, made use of concrete construction before 1900 in one of their overseas projects. The dams built by British engineers in the 1890s in India were among the largest in the world, and in the case of the Periyar dam, mentioned earlier in connection with Professor Rankine's theoretical work, the problem was to build a structure 160 feet high in the absence of suitably skilled masons. This difficulty was overcome by the use of concrete, which was used throughout, except for a thin facing of masonry.

Finish
here →

Earth dams continued to be built in large numbers in the second half of the nineteenth century but without the benefit of any theoretical studies. The percentage of earth dams which experienced a partial or total failure was alarmingly high, and this clearly showed that the various empirical design rules being followed were by no means all reliable. Numerous published lists indicate that some tens of earth dams in various parts of the world experienced some sort of serious failure before 1900, and the majority of these were in the United States.²⁷

By far the most common cause of these failures was insufficient spillway capacity—the South Fork dam failure of 1889 was such a case—a defect which stemmed from a continuing inability to predict accurately the volume of overflow with which dams would have to cope. While masonry and concrete dams often survived the consequences of this ignorance, e.g. the Sweetwater dam, earth dams were by contrast very vulnerable, and this aspect of their operation was a stimulus to research into the hydrology of rivers and catchment areas.

The two other predominant causes of failure were piping and slips in the embankments themselves. Before 1900 the percolation of water through and under earth embankments and the stability of earth dam slopes were problems about which very little was known. The continuing

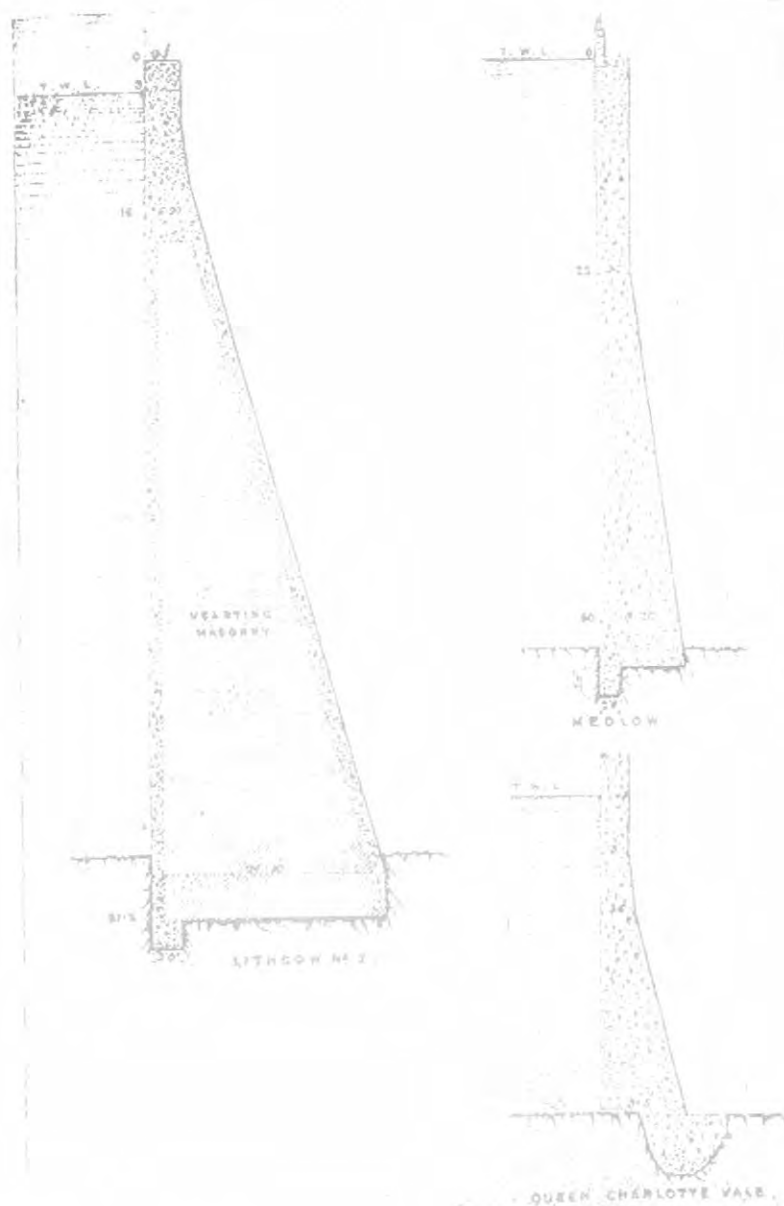


Figure 32 The profiles of three arch dams which were built in New South Wales around 1900. These thin cross-sections caused something of a stir when they were discussed in London in 1909. (From *Min. Proc. Instn. Civ. Engrs.*, Vol. cxxxviii.)

DS

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DEANE KEMP
TONY MOULDS
RAY WHITMORE

Ion Langdon - Jones,
These are the proposed words for
the plaque. I'll send you a copy
of the maker's bromide of the final
design when it comes for checking.

Revised wording for Medlow Bath Dam HEM based on Tony Moulds' response.

Don Francis
23/5/94
Tel/Fax
337 4867

WHEN COMPLETED IN 1907 THIS DAM WAS THE MOST SLENDER ARCH
DAM IN THE WORLD AND WAS ACKNOWLEDGED INTERNATIONALLY
AS PIONEERING THIN CYLINDRICAL CONCRETE ARCH DAMS. IT WAS
AN INNOVATIVE DESIGN BY L. A. B. WADE AND WAS THE MOST DARING
OF THIRTEEN BUILT BY THE NSW PUBLIC WORKS DEPARTMENT BETWEEN
1896 AND 1908. THEY WERE AN ECONOMICAL FORM OF CONSTRUCTION AND
ENSURED AFFORDABLE WATER SUPPLIES FOR A NUMBER OF RURAL
COMMUNITIES.

70
69 words

ARCH DAMS suggested by Ray Whitmore

Your early reply will be greatly appreciated

Thanks

Don 02337 4867

16/5/94

23/5/94 *If this revised wording OK, don't*
reply and I'll order plaque on
Thursday.

Don

OK by Deane Kemp

OK by Ion Langdon-Jones (WB)

To: Dr. Don Fraser
 Position: _____
 Company: LEA
 Country: _____
 From: _____
 Account No: 427 417 605 000
 Date: 17/5/94
 No of pages (including this one): 1



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Brisbane Qld 4072 Australia

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International +61 7 365 3738

Facsimile (07) 365 3888

Telex UNIVQLD AA 40315

TELEFAX MESSAGE

Revised wording for Medlow Bath Dam HEM based on 'Tony Moulds' response.

WHEN COMPLETED IN 1907 THIS DAM WAS THE MOST SLENDER ARCH
 DAM IN THE WORLD AND WAS ACKNOWLEDGED INTERNATIONALLY
 AS PIONEERING THIN CYLINDRICAL CONCRETE ARCH DAMS. IT WAS
 AN INNOVATIVE DESIGN BY L. A. B. WADE AND WAS THE MOST DARING
 OF THIRTEEN BUILT BY THE NSW PUBLIC WORKS DEPARTMENT BETWEEN
 1896 AND 1908. THEY WERE AN ECONOMICAL FORM OF CONSTRUCTION AND
 ENSURED AFFORDABLE WATER SUPPLIES FOR A NUMBER OF RURAL
 COMMUNITIES.

69 words

Your early reply will be greatly appreciated

Not obvious what "They" refers to.
 Make it "Arch dams..."?

Faxed Tony Moulds 23/5/94
 Peter Kemp

Facsimile:

Date: 21 October 1992

To: Robert Breen, Board of Engineering Executive Officer

URGENT.

Fax number: (06) 273 2358

File: 3/6/

From:

Subject: ASSESSMENT OF MEDLOW DAM HISTORIC ENGINEERING
MARKER PLAQUE NOMINATIONThe
Institution
of Engineers,
Australia
NATIONAL OFFICE

I have examined this nomination and respond as follows:

I declare a conflict of interest and withdraw from
this assessment;* ☐

I endorse the nomination without reservation;

* ☐I endorse the nomination subject to the conditions
described below;* ☒

I am unable to decide for the reasons listed below;

* ☐

I reject the nomination for the reasons listed below.

* ☐

Signed.....

A. Henders

Member, Commemorative Plaque Sub-Committee

Co-opted for Dr Fraser

c.c. Chairman, National Committee on Engineering Heritage

* Tick as appropriate.

1430 Facsimile:

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Date:

To:

Fax number:

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From: **TONY MOULDS** Chairman, National Committee on Engineering Heritage
Facsimile (09) 420 3174
Telephone (09) 420 2196 Business hours



The
Institution
of Engineers,
Australia

Subject:

MEDLOW DAM HEM NOMINATION

I have no problem with the nomination of Medlow Dam for a HEM. However the dam is one representative of a remarkable group of thirteen arch dams built by the NSW PWD between 1896 and 1908. There are others in the group with similar claim to a HEM, Mudgee for instance. I would suggest the point about the group of dams could be brought out on the plaque.

Other notable points about the dams are: these were the first arch dams in the World to be built entirely of concrete; the thin arch dam was proved to be a very economical form of construction in certain circumstances and ensured affordable water supplies for a number of rural communities.

I would like us to get away from the cultural cringe of celebrating Australian engineers' breaking away from the Motherland, and certainly not recording it on plaques. The argument between advocates of gravity dams and arch dams was worldwide and not restricted to the UK and Australia; and the argument continued for decades after 1908. Surely the point could be made by merely noting that the design(s) were "innovative", or even "groundbreaking".

Tony Moulds
18 May 1994

National Committee on Engineering Heritage

Facsimile:

Date: ~~21 October 1992~~

Total no. pages
(including this one)

1

To: Robert Breen, Board of Engineering Executive Officer

fax to DF 9/5/94

Fax number: (06) 273 2358

File: 3/6/90

From:

DKCamp

Subject:

ASSESSMENT OF MEDLOW DAM HISTORIC ENGINEERING
MARKER PLAQUE NOMINATION



The
Institution
of Engineers,
Australia

NATIONAL OFFICE

I have examined this nomination and respond as follows:

I declare a **conflict of interest** and withdraw from
this assessment;

* ☐

I endorse the nomination without reservation;

* ☐

I endorse the nomination subject to the conditions
described below;

* ☒

I am unable to decide for the reasons listed below;

* ☐

I reject the nomination for the reasons listed below.

* ☐

*Reconsider plaque words.
As drafts stop at Department
and then say what the
purpose of the dam was (is) and
how useful to the community*

Signed.....

Deane *11/94*
Member, Commemorative Plaque Sub-Committee

c.c. Chairman, National Committee on Engineering Heritage

* Tick as appropriate.



The Institution of Engineers, Australia

ESTABLISHED 1919 • INCORPORATED 1928
INCORPORATED BY ROYAL CHARTER 1938

SYDNEY DIVISION
ENGINEERING HERITAGE COMMITTEE

EAGLE HOUSE,
118 ALFRED STREET,
MILSONS POINT 2061

TELEPHONE: 929 6544

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO:
THE SECRETARY,
BOX 138, POST OFFICE,
MILSONS POINT, 2061

COPY

PLEASE REPLY TO:

57/6 Hale Road
MOSMAN NSW 2088

30.3.94

Telephone: 909 2588

Mr Ian Langdon-Jones
Senior Design Engineer Dams
Level 7
Water Board
370 Pitt Street
SYDNEY NSW 2000

Dear Mr Langdon-Jones

The Engineering Heritage Committee of the Sydney Division of the Institution of Engineers, Australia discussed conferral of an Historic Engineering Marker on the Medlow Dam, near Blackheath, and considered it appropriate to do so during the Institution of Engineers Country Engineers' Convention which is to be held at Medlow Bath in August 1994.

There is an appreciable amount of preliminary work to be done, and I am writing to you to ascertain whether you are in principle agreeable to this proposal. If so, would you please issue an acceptance in writing so that this may be included in the submission which is presently being prepared.

Yours sincerely

HENRY JCOWAN
Secretary

copies: Mr Bowie
Professor Fraser